

Class Notes for Tuesday July 26, 2011

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Topic: Procedural vs. Conceptual Understanding

Administrative:

- You do not need to reflect on the Carraher article on Thursday's reading response. Instead, use it as a tool for steering the conversation in class
- In the reading responses you turn in, underlines and check marks are positive
- For the reading responses, the class in general needs to provide more detail and be concise (therefore the 350 word limit no longer exists)

Side notes on Theory vs. Method:

- Conceptual vs. Procedural arguments do not form theories. They are just tools to see *how* we should teach
- Behaviorists are not concerned with the mental processes required to arrive at a solution. Rather, behaviorism is more focused on affecting the student's behaviors

Class Examples of Conceptual vs. Procedural Activities:

- Testing knowledge about a concept first (the theory behind an algebraic equation) and then asking a question about the procedure of solving an algebraic equation
- Using story problems as a means of reinforcing and assessing whether you know how to apply the formula and if you know the theory behind the formula
- Using specific systems of equations and then graphing them (conceptual), then moving on with procedural knowledge of a general formula (procedural). Finally, assessing the student with word problems (conceptual)
- Doing an experiment on what gravity represents such as throwing two different weighing objects off a tall building (conceptual) and then following the knowledge learned with story problems (procedural) that deal with the different variables
- Hands-on dissection of an organism first and then asking questions about how the different body parts interact with each other

Discussion side-notes on the activities:

- A common agreement that procedural understanding is also important to include because 100% conceptual learning would be too overwhelming for a student

- A thought that conceptual understanding should be more about what a topic (such as a vertex of a parabola) *represents* rather than doing activities that are simply story problems that deal with how to apply different variables and formulas
- Tying in the topic with other disciplines and topics (ex: a topic could be on the digestive system. You could also tie in how drugs and alcohol effect the digestive system)
- A thought that sometimes only procedural understanding is necessary because the age level or class curriculum is not ready for the conceptual understanding (might be too out of scope of the class)

TIMSS Study (video) discussion:

- The American teacher tended to be more procedural than conceptual because he focused on students getting the correct answer rather than how the Japanese teacher focused on developing logical reasoning and problem-solving skills
- The Japanese teacher had a more engaging environment because he had a more welcoming environment (sense of humor, students get into small groups to explain thinking, etc.)
- The German teacher seemed to have a goal of conceptual understanding by having the kids reflect and share their logical reasoning on their homework solutions. However, the content was focused on having the students develop procedural knowledge. In contrast, the American teacher did not allow the students to reflect on their thinking; if a student had an incorrect answer to his class question, he would simply tell them they were incorrect and move on.
- The Japanese teacher gave a problem to the class that had no one specific answer (thereby forcing the students to force on the conceptual understanding or HOW) whereas the German and American teachers had problems which had one solution
- The Japanese teacher was more focused on structured problem-solving (conceptual)
- The German teacher was more focused on developing advanced procedures (procedural)
- The American teacher was more focused on practicing procedures and learning terminology (procedural)